

# A Comparative Study on Anomia in Kashmiri and Urdu Language among Kashmiri Speaking Alzheimer's Disease Patients: A Statistical Report

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**Abstract:** *Alzheimer's disease (AD) was first described by German psychiatrist and neuro-pathologist Alois Alzheimer in 1906 and is named after him. Characterized by the loss of neurons and synapses in the cerebral cortex and certain sub-cortical regions. The present study is an attempt to document Word retrieval deficiency/Anomia found in Kashmiri-Urdu bilingual Alzheimer's disease (AD) patients using comparative study. Forty mild-moderate-advanced AD patients and 30 controls matched for age, gender and education completed a simple picture recognition task will be considered for the present study. Cross-sectional comparisons in the present study indicated that bilingual AD patients show satisfactory control over Kashmiri Anomia Test as compared to Urdu Anomia Test. Moreover, this paper also shows the male AD patients have better control over both the languages than female AD subjects. This paper will attempt to look at the effect of Alzheimer's disease on the patient's concept and perception of both language's naming system.*

**Keywords:** Alzheimer's disease, Bilingual, Neuropathologist, Retrieval, Kashmiri

## 1. Background

Alzheimer's disease (AD) affects older people's memory, thought and behavior. AD progresses inexorably, causing individuals with the condition to gradually forget knowledge acquired throughout life and interfering with recall of even the simplest among everyday activities. Eventually patients will end up forgetting even the names of their family members. While the majority of scientists hold the belief that AD is not a normal part of aging, considerable debate still surrounds the issue. Alzheimer's disease disrupts critical metabolic processes that keep neurons healthy. These disruptions cause nerve cells in the brain to stop working, lose connections with other nerve cells, and finally die. The destruction and death of nerve cells causes the memory failure, personality changes, problems in carrying out daily activities, and other features of the disease.

## 2. Objective

This paper will attempt to look at the effect of Alzheimer's disease on the patient's concept and perception of both language's naming system/Word Retrieval system and to check whether Kashmiri language overshadows the Urdu language and vice-versa or both the languages get degenerated at same speed.

### Epidemiology

The most important risk factors for AD are old age and a positive family history. The frequency of AD increases with each decade of adult life, reaching 20–40% of the population over the age of 85. A positive family history of dementia suggests a genetic cause of AD, although autosomal dominant inheritance occurs in only 2% of patients with AD. Female gender may also be a risk factor independent of the greater longevity of women.

### Pathology

At autopsy, the earliest and most severe degeneration is usually found in the medial temporal lobe

(entorhinal/perirhinal cortex and hippocampus), lateral temporal cortex, and nucleus basalis of Meynert. The characteristic microscopic findings are neuritic plaques and NFTs. These lesions accumulate in small numbers during normal brain aging but dominate the picture in AD.

## 3. Methodology

A random sample of forty cases of clinically diagnosed Alzheimer's disease patients and thirty normal people as control group are considered for the present study. The data were collected from Shri Maharaja Hari Singh Hospital, and some of them were met personally at their home. The subjects were in the age group 60 to above 90 years. These forty subjects, upon whom tests were administered, were considered for further study.

This paper deals with the analysis of the forty subjects, who suffered neuro-degeneration to the different parts of the brain and were able to respond to the tests, along with the thirty subjects as normal control group. On the basis of the medical reports, all subjects under study are categorized into three groups: Mild AD, Moderate AD, and Advanced AD. Out of forty cases, 15 cases were Mild AD cases, 14 were AD Moderate and 11 were Advanced AD patients.

### Test Batteries for Language Deficit

Since the present study is focused on Linguistic Profiling of Alzheimer's disease rather than Dementia, it was decided to perform a simple Kashmiri and Urdu bilingual Test with focus on language deficit in production, comprehension, picture naming and picture recognition abilities in Kashmiri and Urdu language. Phonologically patterned structures was given to both groups. The bilingual phonological test includes 65 pictures (objects, animals, parts of body) and 2 marks are allotted for each correct response (2 for Urdu). The present paper is focused on Anomia in Kashmiri and Urdu Language.

#### 4. Statistical Procedure

Out of various softwares available for the statistical analysis, SPSS (Statistical software for social sciences) is used for the statistical analysis of data. For the data analysis in present study, SPSS used. The statistical technique namely Distance Correlation is used to determine the association between the variables in the form of distances, more the distance far the variables are from each other and vice versa.

##### Discussion on Distance Correlation Results

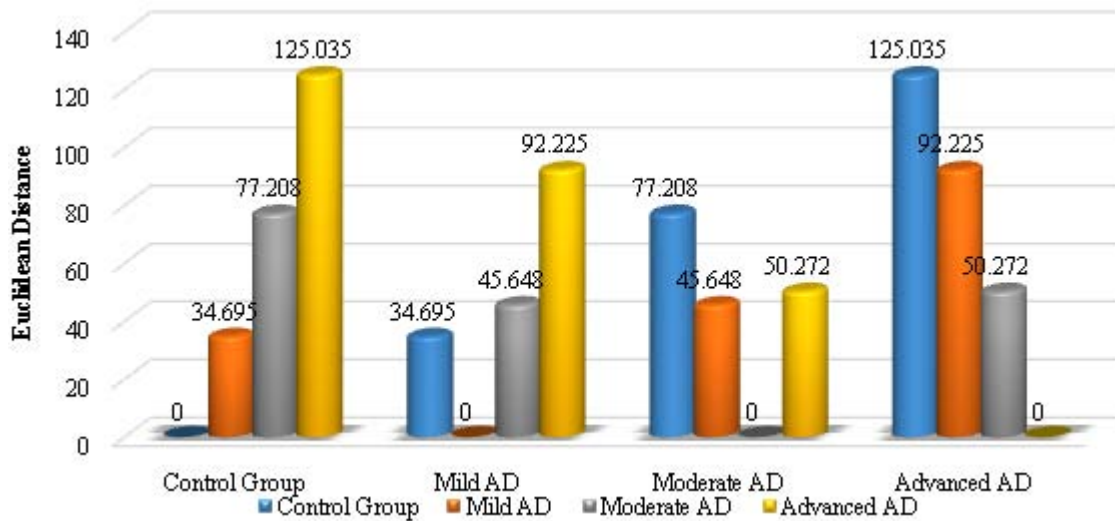
The distance correlation displays Bar graphs based on Case summaries and Proximity matrix of Anomia Test:

#### THE SPSS OUTPUT FOR DISTANCE CORRELATION AMONG MALE MILD, MODERATE AND ADVANCED AD GROUPS AND DISCUSSION ON CORRELATION RESULTS.

##### Proximity matrix and Case Summaries showing Distance Correlation in Case of Kashmiri Anomia

**Table 1:** Case Summaries

	Control Group	Mild AD	Moderate AD	Advanced AD
Mean	59.2	47	27.3	5.4
Std. Deviation	4.14815	3.27109	4.57712	1.94936
Time /Person	395	557	1215	1500



**Figure 1:** Euclidean distance showing difference between Mild, Moderate and Advanced Male AD Patients in case of Kashmiri Anomia Test.

From the table and the bar chart given above, the following conclusions can be drawn:

- 1) Mild AD subjects have better performance in Kashmiri Anomia test as compared to Moderate AD and Advanced AD subjects. Hence, there is observable word finding deficiency.
- 2) As compared to Control Group, the Euclidean distance shows increase from Mild AD to Moderate AD and from Moderate AD to Advanced AD subjects. The Euclidean distance between Control Group and Mild AD subjects is 34.7 whereas, the Euclidean distance between Control Group -Moderate AD subjects and Control Group and Advanced AD subjects is 77 and 125 respectively. The

Table 1 indicates that the average score taken by a Control Group in Kashmiri Anomia test is 59 while as score taken by the Subjects in Mild, Moderate and Advanced Stage are 47, 27 and 5 respectively, also the time taken by a Control Group person in this test is 395 seconds while as time taken by Subjects in Mild, Moderate and Advanced Stage are 557, 1215 and 1500 seconds respectively.

**Table 2:** Proximity Matrix

	Euclidean Distance			
	Control Group	Mild AD	Moderate AD	Advanced AD
Control Group	0	34.695	77.208	125.035
Mild AD	34.695	0	45.648	92.225
Moderate AD	77.208	45.648	0	50.272
Advanced AD	125.035	92.225	50.272	0

Table 2 is called a Proximity matrix/Distance Matrix/Dissimilarity Matrix which is used to predict the differences in the variables, more the value between the variables more the variables are far from each other, lesser values shows closeness of the variables, even zero value indicate the similar variables.

Euclidean distance is least for Mild AD subjects and greater for Advanced subjects.

##### Proximity matrix and Case Summaries showing Distance Correlation in Case of Urdu Anomia

**Table 3:** Case Summaries

	Control Group	Mild AD	Moderate AD	Advanced AD
Mean	59.1667	36.75	15.7	1.6
Std. Deviation	3.35765	3.40221	5.23927	1.14018
Time	295	490	1322	1500

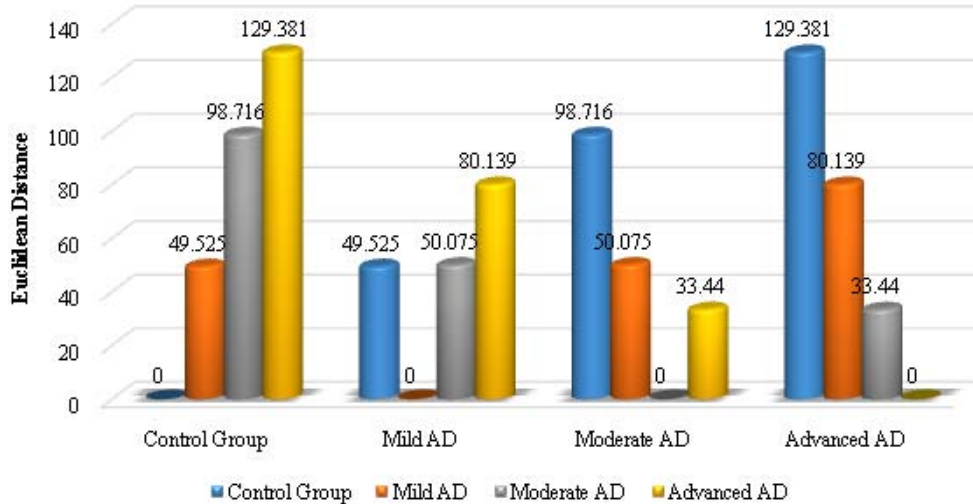
Table 3 indicates that the average score taken by a Control Group in Urdu Anomia test is 59 while as score taken by the

Subjects in Mild, Moderate and Advanced Stage are 36.7, 15.7 and 1.6 respectively, also the time taken by a Control Group person in this test is 295 seconds while as time taken by Subjects in Mild, Moderate and Advanced Stage are 490, 1322 and 1500 seconds respectively.

Table 4 is called a Proximity matrix/Distance Matrix/ Dissimilarity Matrix which is used to predict the differences in the variables, more the value between the variables more the variables are far from each other, lesser values shows closeness of the variables, even zero value indicate the similar variables.

**Table 4:** Proximity Matrix

	Euclidean Distance			
	Control Group	Mild AD	Moderate AD	Advanced AD
Control Group	0	49.525	98.716	129.381
Mild AD	49.525	0	50.075	80.139
Moderate AD	98.716	50.075	0	33.44
Advanced AD	129.381	80.139	33.44	0



**Figure 2:** Euclidean distance showing difference between Mild, Moderate and Advanced Male AD Patients in case of Urdu Anomia Test.

From the table and the bar chart given above, the following conclusions can be drawn:

- 1) Mild AD subjects have better performance in Urdu Anomia test as compared to Moderate AD and Advanced AD subjects. Hence, there is an evident word retrieval deficiency.
- 2) As compared to Control Group, the Euclidean distance shows increase from Mild AD to Moderate AD and from Moderate AD to Advanced AD subjects. The Euclidean distance between Control Group and Mild AD subjects is 49.5 whereas, the Euclidean distance between Control Group -Moderate AD subjects and Control Group-Advanced AD subjects is 98.7 and 129.3 respectively. The Euclidean distance is least for Mild AD subjects and greater for Advanced subjects.

Table 5 indicates that the average score taken by a Control Group in Kashmiri Anomia test is 57.6 while as score taken by the Subjects in Mild, Moderate and Advanced Stage are 35.8, 25.8 and 3.9 respectively, also the time taken by a Control Group in this test is 407 seconds while as time taken by Subjects in Mild, Moderate and Advanced Stages are 563, 1239 and 1500 seconds respectively.

**Table 6:** Proximity Matrix

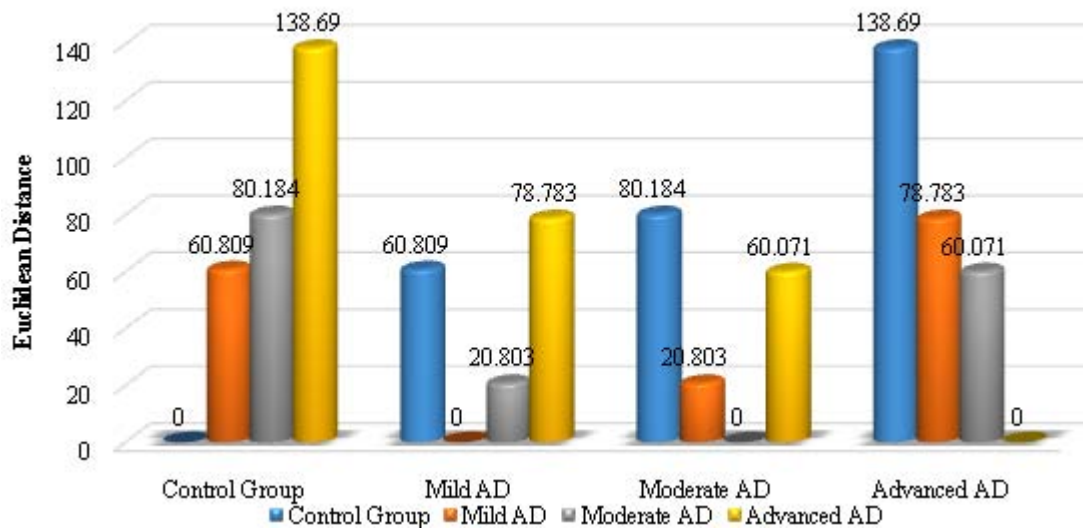
	Euclidean Distance			
	Control Group	Mild AD	Moderate AD	Advanced AD
Control Group	0	60.809	80.184	138.69
Mild AD	60.809	0	20.803	78.783
Moderate AD	80.184	20.803	0	60.071
Advanced AD	138.69	78.783	60.071	0

Table 6 is called a Proximity matrix/Distance Matrix/ Dissimilarity Matrix which is used to predict the differences in the variables, more value between the variables corresponds to the severity of the case. Whereas, 0 value indicates that variable are same.

**The SPSS Output for Distance Correlation of the Deficits of Language and Number among Female Mild, Moderate and Advanced Ad Groups and Discussion on Correlation Results Proximity Matrix And Case Summaries Showing Distance Correlation In Case Of Kashmiri Anomia Test**

**Table 5:** Case Summaries

	Control Group	Mild AD	Moderate AD	Advanced AD
Mean	57.6667	35.8889	25.875	3.9167
Std. Deviation	3.09762	2.9238	5.14608	2.41695
Time/Person	407	563	1239	1500



**Figure 3:** Euclidean distance showing difference between Mild, Moderate and Advanced Female AD Patients in case of Kashmiri Anomia Test

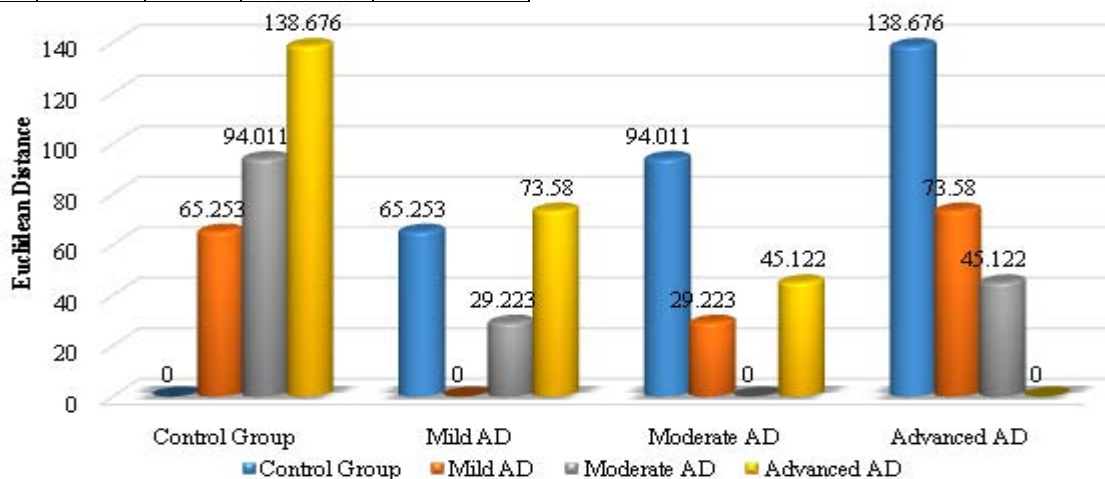
From the table and the bar chart given above, the following conclusions can be drawn:

- 1) Mild AD subjects have better performance in Kashmiri Anomia test as compared to Moderate AD and Advanced AD subjects. Hence, there is observable cumulative word finding deficiency.
- 2) As compared to Control Group, the Euclidean distance shows increase from Mild AD to Moderate AD and from Moderate AD to Advanced AD subjects. The Euclidean distance between Control Group and Mild AD subjects is 60.8 whereas, the Euclidean distance between Control Group -Moderate AD subjects and Control Group and Advanced AD subjects is 80 and 138.6 respectively. The Euclidean distance is least for Mild AD subjects and greater for Advanced subjects.

### 5.3.2. Proximity matrix and Case Summaries showing Distance Correlation in Case of Urdu Anomia Test

**Table 7:** Case Summaries

	Control Group	Mild AD	Moderate AD	Advanced AD
Mean	57.8	32.6667	18.0625	1.8333
Std. Deviation	2.38896	2	5.37479	1.16905
Time	305	530	1268	1500



**Figure 4:** Euclidean distance showing difference between Mild, Moderate and Advanced Female AD Patients in case of Urdu Anomia Test.

Table 7 indicates that the average score taken by a Control Group in Urdu Anomia test is 57.8 while as score taken by the Subjects in Mild, Moderate and Advanced Stage are 32.6, 18 and 1.8 respectively, also the time taken by a Control Group person in this test is 305 seconds while as time taken by Subjects in Mild, Moderate and Advanced Stages are 530, 1268 and 1500 seconds respectively.

**Table 8:** Proximity Matrix

	Euclidean Distance			
	Control Group	Mild AD	Moderate AD	Advanced AD
Control Group	0	65.253	94.011	138.676
Mild AD	65.253	0	29.223	73.58
Moderate AD	94.011	29.223	0	45.122
Advanced AD	138.676	73.58	45.122	0

Table 8 is called a Proximity matrix/Distance Matrix/Dissimilarity Matrix which is used to predict the differences in the variables, more value between the variables corresponds to the severity of the case. Whereas, 0 value indicates that variable are same.



From the table and the bar chart given above, the following conclusions can be drawn:

- 1) Mild AD subjects have better performance in Urdu Anomia test as compared to Moderate AD and Advanced AD subjects. Hence, there is an evident amassed word retrieval deficiency.
- 2) As compared to Control Group, the Euclidean distance shows increase from Mild AD to Moderate AD and from Moderate AD to Advanced AD subjects. The Euclidean distance between Control Group and Mild AD subjects is 65.2 whereas, the Euclidean distance between Control Group-Moderate AD subjects and Control Group-Advanced AD subjects is 94 and 138.6 respectively. The Euclidean distance is least for Mild AD subjects and greater for Advanced subjects.

## 5. Conclusion

Our findings support the view that anomia occurs early in AD and progresses gradually from Mild to Advanced stage of AD. Bilingual Patients with Mild AD showed significant loss of word retrieval abilities relative to controls and produced a variety of errors in both the languages. It is also indicated that bilingual AD patients have satisfactory control over Kashmiri language as compared to Urdu language. Results also demonstrate that time is directly proportional to severity of disease i.e., lesser severity lesser is the time taken and vice-versa. Whereas, patients with Advanced bilingual AD showed almost complete loss of word retrieval ability due to the severity of disease in both the languages. Moreover, results also show that male AD subjects show better performance in Kashmiri and Urdu Anomia Test as compared to female AD subjects.

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